User's Manual: Series 450T
Model 450T Millivolt/Thermocouple AC-Powered Transmitters

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IMPORTANT SAFETY CONSIDERATIONS

It is very important for the user to consider the possible adverse effects of power, wiring, component, sensor, or software failures in designing any type of control or monitoring system. This is especially important where economic property loss or human life is involved. It is important that the user employ satisfactory overall system design. It is agreed between the Buyer and Acromag, that this is the Buyer's responsibility.

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INSTRUCTIONS: SERIES 450T
Millivolt/Thermocouple AC Powered Transmitters

INTRODUCTION:

These instructions cover the model types listed in Table 1 below. Supplementary sheets are attached for units with special options or features.

Table 1:
A. Model Number Format: 450T-Input-Output-Power-Mtg-Certif.-Calibration
B. Typical Model Number: 450T-TC1-Y-1-DIN-NCR-C

Series	-Input	-Output	-Power	-Mounting	-Certif.	-Cal.*
450T	-MV1 -MV2 -MV3 -TC1 -TC3 -JLxx -KLxx -TLxx -ELxx -RLxx -SLxx -BLxx	-Y -VO -V5	-1 -2	-DIN	-NCR -Approval**	(Blank) -C

Notes (Table 1):

* The MV1, MV2 and TC1 can be ordered with or without factory calibration ("-C" option). All other input types except custom linearizer ranges automatically include calibration to the customer's specification (no "-C" needed). Any customer specified calibration information will be included on a separate calibration label on the unit. For thermocouple units, the TC type, input calibration, and TC Break Detection (UP, DOWN or NONE) must be specified.

** Consult the factory for current information on agency (e.g. Canadian Standards Association, etc.) approvals.

xx Range Code Number: Standard range code will have a number (01, 12, etc.). Consult the selection and ordering guide for standard range codes. If the unit requires a custom range for the linearizer a "00" will be used and the unit's label will indicate the range.

DESCRIPTION:

The Series 450T is an AC-powered, three-way isolated, DIN-rail mounted transmitter family. This model conditions millivolt or thermocouple input signals and converts this signal to a process current or voltage output. Other 450T transmitters are available to condition voltage, current, RTD, and frequency inputs. In addition to three-way isolation, this model also provides high input impedance, thermocouple reference junction compensation, upscale or downscale thermocouple break detection, and wide-range zero and span adjustments. Optionally, a five segment linearizer is available to correct for thermocouple non-linearity over a customer-specified calibration range. Series 450T transmitters are available for 115V, or 230V AC power (for DC power applications, see the Acromag Series 350T transmitter family). The versatile DIN rail mount can accommodate a variety of mounting applications. See Drawing 4501-349 for a simplified schematic.

The Series 450T is another member of the Acromag flat-pack, DIN-rail mounted instrument family. It provides another functional component for a modular solution to varied field applications. The Series 450T complements the Acromag Series 350T DC-powered transmitters, providing the same input conditioning for AC-powered applications. The modular approach of this design and companion Acromag flat-pack modules allows additional transmitters, input modules, isolators, and alarms to be easily integrated, as required.

The 450T transmitter is EMI and RFI protected, operates over a wide temperature range, and features excellent temperature coefficients which minimize the effects from harsh plant environments. In addition, the safe, compact, rugged, and reliable design of this transmitter allow it to be used in control room or field locations.

Input wiring is inserted in the bottom of the unit, while the output and power wiring is inserted at the top of the unit. Screws to secure the wiring are located on the front panel. Connectors are screw-clamp type and accept wire size up to 14 AWG.

SPECIFICATIONS:

Function: This AC-powered transmitter conditions either millivolt or thermocouple input signals and converts this signal to a process current or voltage output. The unit provides three-way isolation between the input, output, and power circuits. Wide-range zero and span adjustments utilize 22-turn potentiometers accessible from the front of the unit. Optional 115V or 230V AC power may be selected. This transmitter is DIN-rail mounted.

MODEL/SERIES: 450T- (Color coded with a white label)

INPUT: Millivolt and Thermocouple. Input span and zero ranges are adjustable as specified below, except for linearized thermocouples and special ranges which are factory calibrated per customer specifications. Both the span and zero adjustment capability are covered in two ranges and configured by internal jumpers on the circuit board. The narrow span units (-MV3, -TC3) are configured and calibrated per customer requirements.

-MV1: Millivolt - Standard Span: Span: 5 to 55mV; Zero: -5 to +25mV.
-MV2: Millivolt - Wide Span: Span: 25 to 250mV; Zero: -25 to +125mV.
-MV3: Millivolt - Narrow Span (Custom Calibration): Unit handles millivolt spans from 3 to 5mV with the range factory calibrated to customer specifications.

-TC1: Thermocouple - Standard Span: TC Types J, K, T, E, R, S, and B (Non-linearized): TC Type is field selected via internal jumper.

J: ISA Type J, Iron/Constantan:
Span: 100 to 760°C Zero: -100 to 450°C
K: ISA Type K, Chromel/Alumel:
Span: 100 to 1200°C Zero: -100 to 600°C
T: ISA Type T, Copper/Constantan:
Span: 100 to 400°C Zero: -150 to +300°C
E: ISA Type E, Chromel/Constantan:
Span: 100 to 700°C Zero: -100 to +350°C
R: ISA Type R, Plat/Plat 13% Rhod:
Span: 550 to 1750°C Zero: 0 to 1200°C.
S: ISA Type S, Plat/Plat 10% Rhod:
Span: 550 to 1750°C Zero: 0 to 1200°C.
B: ISA Type B, Plat 6% Rhod/Plat 30% Rhod:
Span: 1000 to 1820°C Zero: 0 to 1000°C.

-TC3: Thermocouple - Narrow Span (Custom Calibration): Unit handles temperature equivalent millivolt spans from 3 to 5mV with the range factory calibrated to customer specifications. NOTE: The thermocouple type and TC-Break (UP, DOWN or NONE) must also be specified. The linearization option is not available (or needed).

The following group of input types include the linearization circuit. The standard span transmitter is linearized per the customer specified calibration range. The range code (xx in Input field below) is used to represent the input range required. Consult the Selection and Ordering Guide for standard range codes. Custom range codes are also available --consult the factory.

-JLxx: ISA Type J, linearized.
-KLxx: ISA Type K, linearized.
-TLxx: ISA Type T, linearized.
-ELxx: ISA Type E, linearized.
-RLxx: ISA Type R, linearized.
-SLxx: ISA Type S, linearized.
-BLxx: ISA Type B, linearized.

Isolation: Three-way isolation is provided between input, output, and power for common mode voltages up to 250V AC, or 354V DC off ground, on a continuous basis (will withstand 1500V AC dielectric strength test for one minute without breakdown). This complies with test requirements outlined in ANSI/ISA-S82.01-1988 for the voltage rating specified.

OUTPUT: Process Current or Voltage output. Voltage outputs are designed to provide true voltage output, with zero volts included, and to be stable with capacitive loads.

-Y : 4 to 20mA DC, R-Load = 0 to 600 ohms
-V0: 0 to 10V DC into 10,000 ohms or greater
-V5: 0 to 5V DC into 5,000 ohms or greater

NOTE: For process current output (-Y units), the loop current may be monitored by placing a DVM between the Output (S) and Output (+) terminal. This connection measures the current drop through a precision 10 ohm resistor placed in series with the Output (+) terminal (+/-0.1%, 25ppm). A DVM measurement of 40mV corresponds to 4mA, and 200mV corresponds to 20mA of loop current. For voltage outputs (-Vx units), the Output (S) terminal is electrically equivalent to the Output (+) terminal.

Output Limiting: Voltage units (-Vx): 120% of full scale output, nominal. Current unit (-Y): 125% of full-scale output (24mA), nominal.

Output Ripple: Less than +/-0.1% of the maximum output span.

POWER: -1: 115V AC +/-10%, 50 to 60Hz, 0.05A (-Y units), 0.020A (-Vx units).
-2: 230V AC +/-10%, 50 to 60Hz, 0.025A (-Y units), 0.010A (-Vx units).

Power Supply Effect: Less than +/-0.01% of output span for rated supply variations.

Input Impedance:

A. Millivolt and Thermocouple Inputs (Without TC Break Detection): 1.0M ohm at 10mV span, typical; input current, +/-10nA, typical.
B. Thermocouple Inputs (Utilizing TC Break Detection): 400K ohm at 10mV span; input current, +/-25nA, typical (+/-30nA, maximum).

Thermocouple Models:

A. Thermocouple Reference Junction Compensation: standard on all thermocouple units and functional over the entire operating temperature range. Includes unique circuitry to correct for reference junction non-linearity over ambient temperature. Reference Junction Compensation Ambient Temperature Effect: +/- 0.02^{o}C/^{o}C, typical.
B. Thermocouple Break Detection: user-selectable for Upscale, Downscale, or None. Up or downscale break detection is selectable via an internal jumper and activated via an external jumper.

Reference Test Conditions: Input: 0-10mV with a 100 ohm resistive source; Output (-Y units): 4-20mA DC (500 Ohm load); Output (-Vx units): 0-10V DC into 10K ohms or greater; Ambient 77°F (25°C); 115V AC supply.

Accuracy: Better than +/-0.1% of calibrated span or +/-0.01 mV, whichever is greater. This error includes the combined effects of transmitter repeatability, hysteresis, terminal point linearity (conformity instead of linearity for thermocouple inputs, non-linearized), and adjustment resolution. Does not include sensor error.

Linearization (-xLxx) Option: Optional linearized thermocouple units contain a five segment linearizer to correct for thermocouple non-linearity. This option offers low cost linearization and provides a minimum 10 to 1 improvement +/-0.1% in the linearity curve for the specified range of type J, K, T, R, S, E, and B ISA rated thermocouples.

Ambient Temperature Range: -13°F to 185°F (-25°C to 85°C).

Ambient Temperature Effect: Less than +/-0.01% of output span per °F (+/-0.018% per °C) over the ambient temperature range for reference test conditions; +/-0.025% of output span per °F (+/-0.045% per °C) for narrow span units less than or equal to 5mV of span. Specification includes the combined effects of zero and span over temperature.

Bandwidth: -3dB at 3 Hz, typical.

Response Time: For a step input, the output reaches 98% of output span in 300ms, typical.

Noise Rejection:
Common Mode: 130dB at 60 Hz, 100 ohm unbalance, typical.
Normal Mode: 30dB at 60 Hz, 100 ohm source, typical.

RFI Resistance: Less than +/-0.5% of output span with RFI field strengths of up to 10V/meter at frequencies of 27, 151 and 467 MHz.

EMI Resistance: Less than +/-0.25% of output span effect with switching solenoids or commutator motors.

Surge Withstand Capability (SWC): Input/Output terminations rated per ANSI/IEEE C37.90-1978. Unit is tested to a standardized test waveform that is representative of surges (high frequency transient electrical interference), observed in actual installations.

Construction:
Printed Circuit Boards: Military grade FR-4 epoxy glass circuit board.
Terminals: Compression type, wire size 14 AWG maximum.
Case: Self-extinguishing NYLON Type 6.6 polyamide thermoplastic UL94 V-2, color black. General Purpose, NEMA Type 1 enclosure. Printed Circuit Board Coating: Fungus resistant acrylic conformal coat.
Mounting Position: Position insensitive.

MOUNTING:

-DIN: General Purpose Housing, DIN-Rail Mount - "G" & "T" rails. "G" Rail (32mm), Type EN50035; "T" Rail (35mm), Type EN50022. Refer to Drawing 4501-348 for outline and clearance dimensions.
Shipping Weight: 1 pound (0.45Kg) packed.

CERTIFICATION: Consult the factory for current information on the availability of agency (e.g. Canadian Standards Association, Factory Mutual, etc.) approvals.

-NCR: No Certification Required.

INSTALLATION:

The transmitter is packaged in a general purpose type of enclosure. Use an auxiliary enclosure to protect against unfavorable environments and locations. Maximum operating ambient temperatures should be within -13^{o}F to 185^{o}F (-25^{o}C to 85^{o}C) for satisfactory performance. If the unit is factory calibrated, it is ready for installation. Connect as shown in the connection diagram of Drawing 4501-349. If the unit is not factory calibrated, refer to the "CALIBRATION" section.

Mounting: Mount transmitter assembly - refer to Drawing 4501-348 for mounting and clearance dimensions.

DIN Rail Mounting: Using suitable fastening hardware, secure the DIN rail to the designated mounting surface. A transmitter can be mounted to either the "T" or "G" Rail. Installation of the transmitter to the rail depends on the type of DIN rail used. Units can be mounted side-by-side on 1.6 inch centers, if required.

"T" Rail (35mm), Type EN50022: To attach a transmitter to this style of DIN rail, angle the top of the unit towards the rail and locate the top groove of the adapter over the upper lip of the rail. Firmly push the unit towards the rail until it snaps solidly into place. To remove a transmitter, insert a screwdriver into the lower arm of the connector and pull downward while applying outward pressure to the bottom of the unit.

"G" Rail (32mm), Type EN50035: To attach a transmitter to this style of DIN rail, angle the unit so that the upper groove of the adapter hooks under the top lip of the rail. Firmly push the unit towards the rail until it snaps solidly into place. To remove a transmitter, pull the lower part of the unit outward until it releases from the rail and lift the unit from the rail.

Electrical Connections:

Regardless of the mounting configuration employed, the electrical connections are basically identical. The wire size used to connect the unit to the control system is not critical. All terminal strips can accommodate wire from 14-26 AWG. Strip back the insulation 1/4-inch on each lead before installing it into the terminal block.

Input wiring may be either shielded or unshielded twisted pair. Output wires should be twisted pair. Since common mode voltages can exist on signal wiring, adequate wire insulation should be used and proper wiring practices followed. It is recommended that the output and power wiring be separated from the signal wiring for safety as well as for low noise pickup.

1. **Power (Refer to Drawing 4501-349 for power connections):**
   The label on the unit specifies the AC power requirements. Connect AC power as shown in the connection diagram (Drawing 4501-349). Use suitable wire per applicable codes. For 115V AC units, connect the AC HOT power lead to the (L1) terminal and the AC NEUTRAL power lead to the terminal marked (W). For 230V AC units, connect the AC L1 power lead to the (L1) terminal and AC L2 power lead to the terminal marked (L2). Connect the AC GROUND lead to the (G) terminal (the AC Ground (G) terminal is not connected internally).
2. **Grounding:** The transmitter housing is plastic and does not require an earth ground connection. If the alarm is mounted in a metal housing, a ground wire connection is required. Connect the ground terminal of the metal housing (Green Screw) to a suitable earth ground using appropriate wire per applicable codes.
3. **Output:** Connect output per connection diagram, refer to Drawing 4501-349. Load range is a function of the module's output type; refer to "Output" in the preceding "SPECIFICATIONS" section. The output is isolated from the input and power circuits.
4. **Input:** Connect input per connection diagram, observe proper polarity, see label for input type. If unit is factory calibrated, the calibration label indicates range of input. NOTE: The input circuit is electrically isolated from the output and power circuit allowing the input to operate up to 250V AC or 354V DC off ground on a continuous basis. If your input is a thermocouple, the thermo-couple break circuit will be activated by placing a short jumper wire between the Input (+) and (L) terminals of the transmitter. The type of Break Detection, UP or DOWN, is configured internal to the transmitter (see CALIBRATION Section).

CALIBRATION:

A. TRANSMITTER:

This section provides information for configuration and calibration. If the unit was factory calibrated, jumpers have been placed in their proper positions and verification of the calibration can be made per the Adjustment Procedure. If the calibration of the unit is to be changed, first go to the "Shunt Block Configuration Procedure" before proceeding with the Transmitter Adjustment Procedure.

1. Transmitter - Shunt Block Configuration Procedure:

The Thermocouple transmitter is quite universal in that it can be configured for any of the standard Thermocouple types. However, the Zero and Span adjustment ranges, thermocouple break detection (UP or DOWN), must be adjusted. Before the adjustment procedure can proceed, the jumpers have to be placed according to the requirements of the application (refer to Drawing 4501-351 for details).

To gain access to the Configuration Jumpers, first remove transmitter from the installation. Second, remove the circuit boards from the plastic enclosure as described in the Disassembly Procedure below. Third, configure jumpers (shunt blocks) as described in the Jumper Configuration procedure below. NOTE: calibration per the Adjustment Procedure should be performed before the circuit boards are reassembled within the plastic enclosure.

Disassembly Procedure for the 450T Plastic Housing:

The plastic housing has no screws, it "snaps" together. A flat-head screwdriver (Acromag 5021-216 or equivalent) is needed to pry the housing apart as described in the following steps.

CAUTION: Do not push the screwdriver blade into the housing more than approximately 0.1 inches while prying it apart. Handling of the printed circuit board should only be done at a static-free workstation, otherwise damage to the electronics could result.

1. To begin disassembly (refer to Drawing 4501-351) place the screw-driver at point A (left side of the alarm). While pressing the blade into the seam, use a twisting motion to separate the sides slightly. Repeat this operation at point B.
2. Now that the two pieces have been partially separated, use the screw-driver blade to work the left side of the package loose by working around the alarm and carefully prying the sides further apart. Repeat this action until it is easy to remove the left side from the plastic pins holding the pieces together.
3. Repeat this operation for the right side starting at points C and D.

CAUTION: If the two PC boards become separated while taking the package apart, re-align the boards making sure that both interconnection headers are aligned with their mating sockets and carefully push the boards together.

Jumper Configuration (Shunt Blocks):

Shunt blocks are provided to accommodate in-field configuration changes. In case of misplacement, additional shunt blocks may be ordered from the factory. When ordering additional shunt blocks, refer to Acromag Part Number 1004-332.

1. THERMOCOUPLE INPUT: Determine the thermocouple type that you want to configure the transmitter for. Refer to table on Drawing 4501-351 for proper jumper (shunt) position.
2. ZERO & SPAN RANGE: The Zero and Span shunt blocks should initially be placed in their default position, "IN" for each case, see Drawing 4501-351. During the process of Calibration, the need to change these jumper positions will be determined.
3. THERMOCOUPLE BREAK DETECTION: Determine whether Up, Down, or No Break detection is required in your application (see Drawing 4501-351 for proper jumper/shunt position). NOTE: This break circuit is activated by a small jumper wire connected between the Input (+) and (L) terminals--if TC break detection is not desired, then do NOT install jumper. This jump wire is not installed on millivolt units.

NOTE: For TC units, it is important to calibrate the transmitter with the TC-break configured per your requirements. Changing the TC break configuration afterward will affect your calibration.

4. IMPORTANT: Mark the Transmitter Configuration on the calibration label on the enclosure. For Example: IN: Type J, UP, 100 to 400^{O}C.

Jumper Configuration Example:

The following is the configuration for the example below, configure your module as required by your application in a similar manner. For our example, configure the internal jumpers as follows:

A. Thermocouple Type: Type J.
B. Zero/Span Range: Zero & Span Jumpers both "IN".
C. Thermocouple Break: Set Upscale (an external jumper is required between the input (+) and (L) also, to activate).

2. Transmitter - Adjustment Procedure:

The calibration example below is for a thermocouple input, which requires an ice-point temperature reference. Calibration of millivolt units is similar, but a reference is not required. To simulate a thermocouple input, an Acromag Series 320 Reference, an ice-bath, or other suitable reference must be used. Refer to Drawing 4501-350. Narrow span and linearized units are already factory calibrated for best performance.

Connect transmitter as shown in the connection diagram Drawing 4501-349. For best results, the input signal source should be adjustable from -5mV to +80mV DC, settable to an accuracy of 0.1% or better, and have a source resistance of 100 ohms or less. The output voltage must be measured to 0.1% accuracy or better for proper results.

The Zero and Span adjustments are accessible on the front panel of the transmitter (see Drawing 4501-349 for location). The screwdriver blade used to adjust the potentiometers should not be more than 0.1 inch (2.54mm) wide. For optimum performance the span and zero capability of the unit is covered in two ranges, which are programmed by internal jumpers on the circuit board.

The Span (S) and Zero (Z) jumpers change the range of adjustment of the span and zero potentiometers. If the zero potentiometer range is found to be inadequate during calibration, move the Zero Shunt from "IN" (Default Position) to "OUT". If the span potentiometer range is found to be inadequate during calibration, move the Span Shunt from "IN" (Default Position) to "OUT". Only move this jumper when it is required. For Shunt Block location refer to Drawing 4501-351.

The voltage representing the temperatures at Zero and at Full-Scale are set on the millivolt source to obtain the two calibration points. Use Table 2 to convert each temperature to its equivalent millivolts (Reference = 0°C) for the thermocouple type used.

TABLE 2: Thermocouple Voltages vs. Temperature:
(Reference: National Bureau of Standards Thermocouple Tables)

Temp.	Thermoelectric Voltage in Millivolts (Ref. Junction At 0°C)						
°C	J	K	T	E	R	S	B
-250		-6.404	-6.181	-9.719			
-200	-7.890	-5.891	-5.603	-8.824			
-150	-6.499	-4.912	-4.648	-7.279			
-100	-4.632	-3.553	-3.378	-5.237			
-50	-2.431	-1.889	-1.819	-2.787			
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
+50	2.585	2.022	2.035	3.047	0.296	0.299	
+100	5.268	4.095	4.277	6.317	0.647	0.645	
+150	8.008	6.137	6.702	9.787	1.041	1.029	
+200	10.777	8.137	9.286	13.419	1.468	1.440	
+250	13.553	10.151	12.011	17.178	1.923	1.873	
+300	16.325	12.207	14.860	21.033	2.400	2.323	
+350	19.089	14.292	17.816	24.961	2.896	2.786	
+400	21.846	16.395	20.869	28.943	3.407	3.260	
+450	24.607	18.513		32.960	3.933	3.743	1.002
+500	27.388	20.640		36.999	4.471	4.234	1.241
+550	30.210	22.772		41.045	5.021	4.732	1.505
+600	33.096	24.902		45.085	5.582	5.237	1.791
+650	36.066	27.022		49.109	6.155	5.751	2.100
+700	39.130	29.128		53.110	6.741	6.274	2.430
+800		33.277		61.022	7.949	7.345	3.154
+900		37.325		68.783	9.203	8.448	3.957
+1000		41.269		76.358	10.503	9.585	4.833
+1200		48.828			13.224	11.947	6.783
+1400					16.035	14.368	8.952
+1600					18.842	16.771	11.257
+1700					20.215	17.942	12.462
+1750					20.878	18.504	13.008
+1800							13.585

Transmitter - Calibration Example:

MODEL : 450T-TC1-Y-1-DIN-NCR
Input : 100^{o}C to 400^{o}C Type-J Thermocouple, Upscale TC Break
Output: 4 to 20mA DC
Power : 115V AC

NOTE: To obtain the most accurate calibration of thermocouple transmitters, apply power to the unit and allow several minutes for thermal stabilization before completing calibration.

1. Set the input source to 5.268mV (100^{o}C). Adjust the Zero (Z) pot until the output reads 4.000mA DC.
2. Set the input source to 21.846mV (400^{o}C). Adjust the Span (S) pot until the output reads 20.000mA DC.
3. Repeat steps 1 and 2 above, until the readings converge. The instrument is now calibrated. Several mid-point values should also be checked to verify proper operation of the transmitter. Remember that the transmitter will be linear with millivolts and not temperature, unless the transmitter includes a linearizer, only then will it be linear with temperature. NOTE: If a transmitter is linearized, the transmitter can only be trimmed to the range indicated on the label - no other range of calibration will give acceptable results.
4. After the above calibration procedure is complete, install the transmitter PC Board assembly back into its case as described in the assembly procedure below.

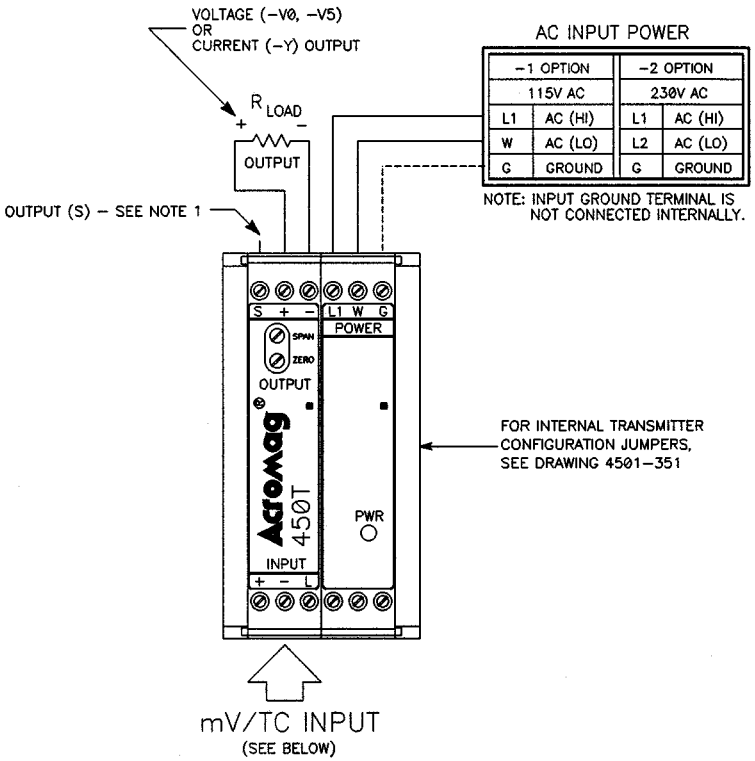
Assembly Procedure for the 450T Plastic Housing:

NOTE: The Model/Serial Number label is attached to the left plastic side.

1. Refer to drawing 4501-351 and line up the left plastic side with the board and terminal assembly. Carefully but firmly press the pieces together.
2. Align the pins of the center section with the side and press the pieces together.
3. Now line up the right side of the housing with the left side and center assembly and carefully but firmly press the pieces together.

GENERAL MAINTENANCE:

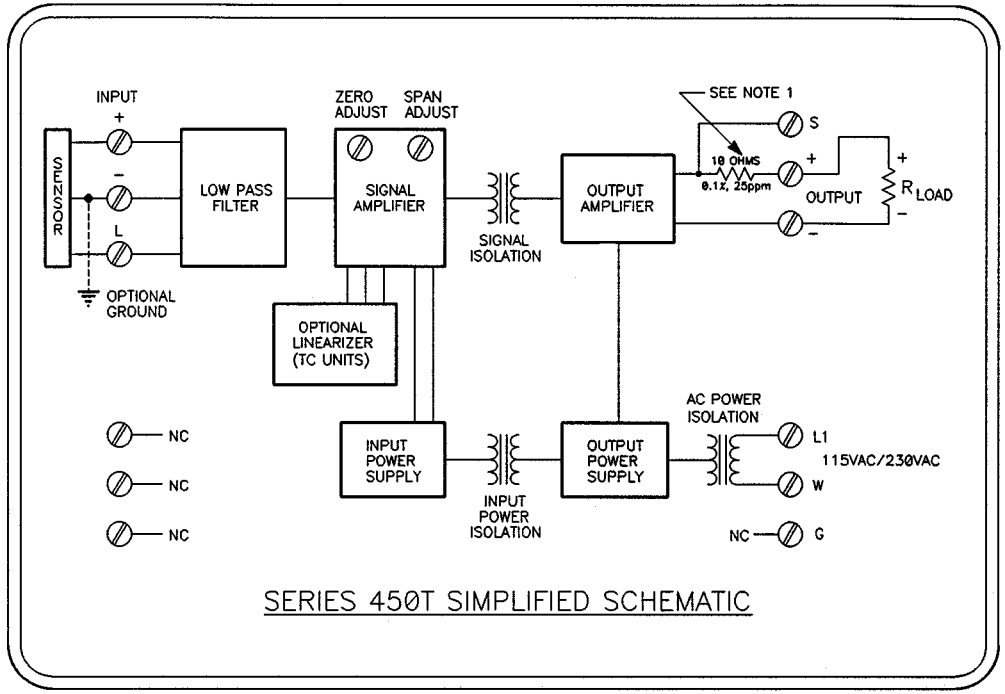
This transmitter contains solid-state components and requires no maintenance except for periodic cleaning and calibration verification. When a failure is suspected, a convenient method for identifying a faulty transmitter is to exchange it with a known good unit. It is highly recommended that a non-functioning transmitter be returned to Acromag for repair, since Acromag makes use of tested and burned-in parts, and in some cases, parts that have been selected for characteristics beyond that specified by the manufacturer. Further, Acromag has automated test equipment that thoroughly checks the performance of each transmitter.



AC INPUT POWER

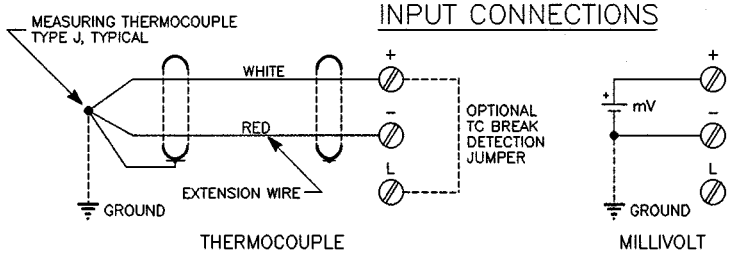
–1 OPTION		–2 OPTION	
115V AC		230V AC	
L1	AC (HI)	L1	AC (HI)
W	AC (LO)	L2	AC (LO)
G	GROUND	G	GROUND

NOTE: INPUT GROUND TERMINAL IS NOT CONNECTED INTERNALLY.



SERIES 450T SIMPLIFIED SCHEMATIC

INPUT CONNECTIONS



ANSI STANDARD THERMOCOUPLE COLOR CODE				
TYPE	(+) INPUT	COLOR	(–) INPUT	COLOR
J	IRON	WHITE	CONSTANTAN	RED
K	CHROMEL	YELLOW	ALUMEL	RED
T	COPPER	BLUE	CONSTANTAN	RED
R	PLAT./13% RHOD.	BLACK	PLATINUM	RED
S	PLAT./10% RHOD.	BLACK	PLATINUM	RED
E	CHROMEL	PURPLE	CONSTANTAN	RED
B	PLAT./30% RHOD.	GRAY	PLAT./6% RHOD.	RED

NOTE:

1. FOR PROCESS CURRENT OUTPUT UNITS (–Y), A PRECISION 10 OHM RESISTOR IS PLACED IN SERIES WITH THE OUTPUT (+) TERMINAL (+/–0.1%, 25ppm). A DVM MAY BE CONNECTED BETWEEN THE OUTPUT (S) AND (+) TERMINAL TO MONITOR THE LOOP CURRENT. THUS, A DVM MEASUREMENT OF 40mV IS EQUIVALENT TO 4mA AND 200mV IS EQUIVALENT TO 20mA OF LOOP CURRENT. FOR VOLTAGE OUTPUT UNITS (–Vx), THE OUTPUT (S) TERMINAL IS ELECTRICALLY EQUIVALENT TO THE OUTPUT (+) TERMINAL.

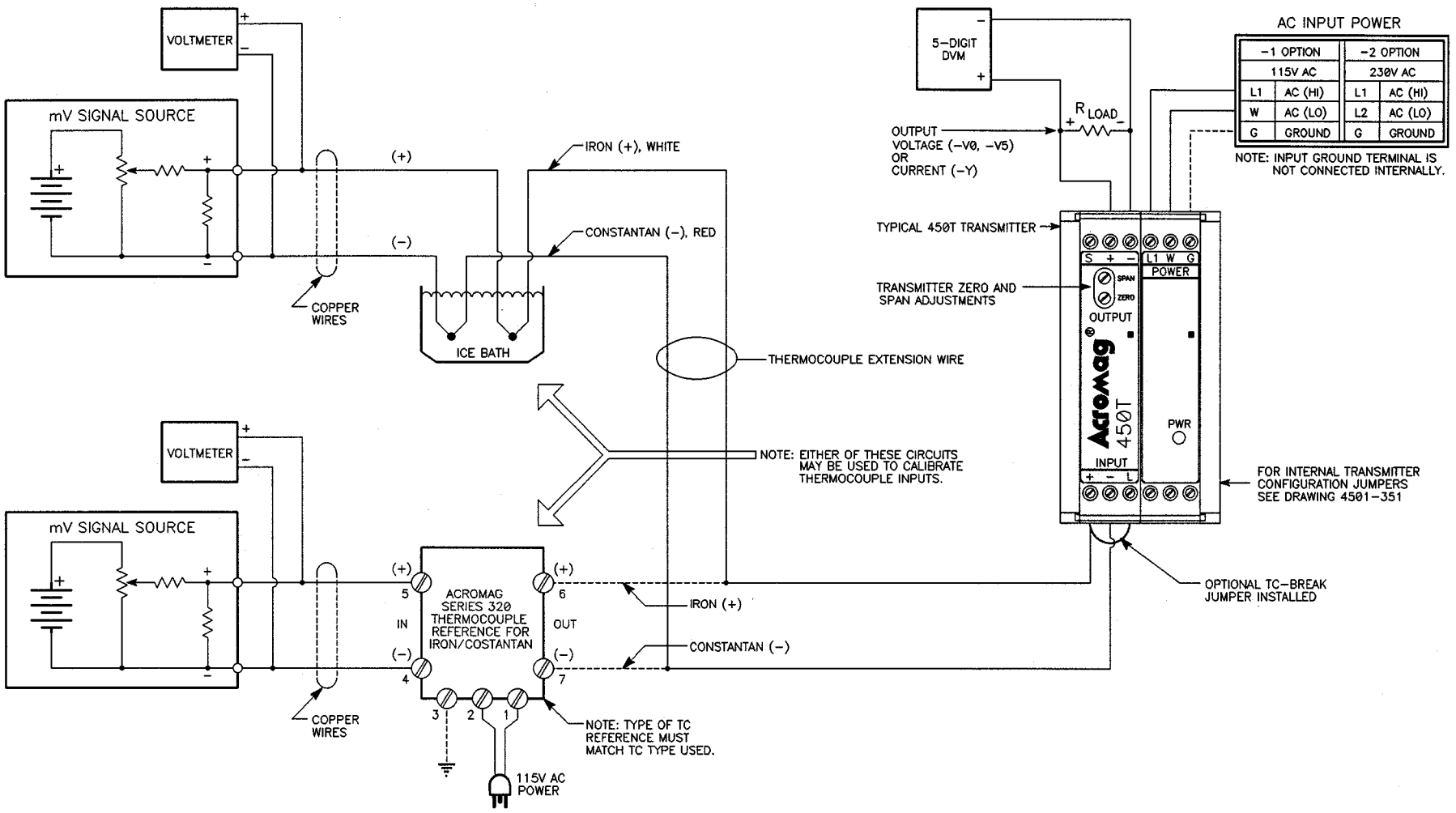
SERIES 450T mV/TC ELECTRICAL CONNECTIONS

Acromag WIXOM, MICH.

DATE	REV	ECN	DR	ENG	QLP
23 SEP 93	A	—	KG	BC	BC

TITLE: SERIES 450T mV/TC INPUT CONNECTIONS

SIZE	SERIES		DWG NO.	REV
D	450T	1 OF 1	4501–349	A



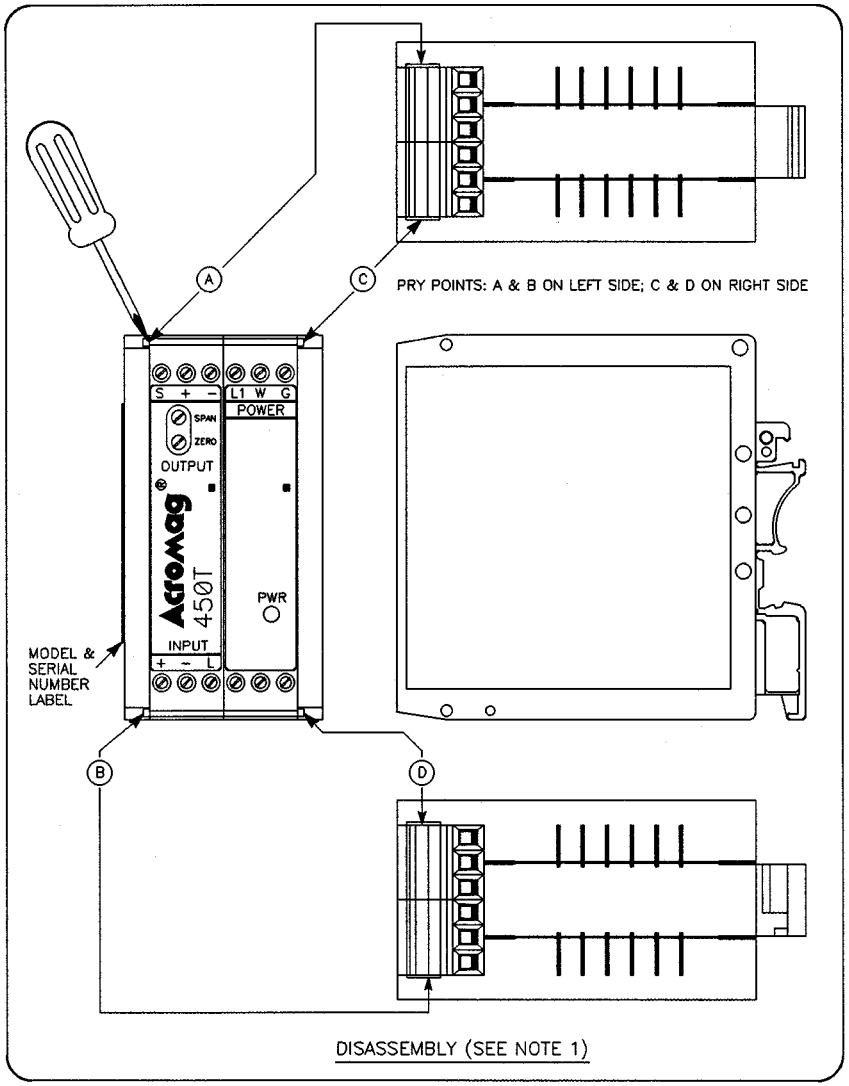
SERIES 450T THERMOCOUPLE CALIBRATION CONNECTIONS

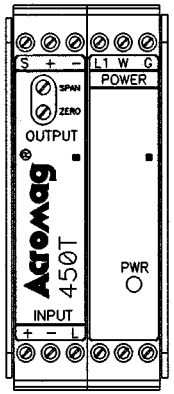
Acromag WIXOM, MICH.

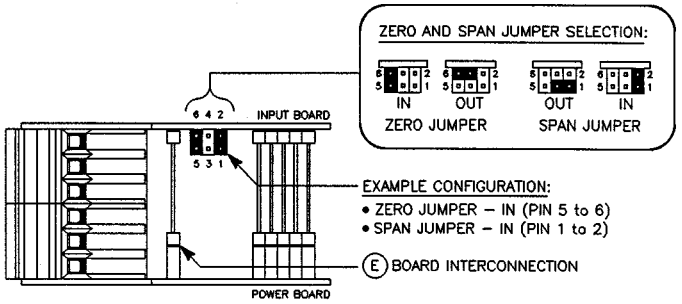
23 SEP 93	A		KG	BC	BC
DATE	REV	ECN	DR	ENG	CLP

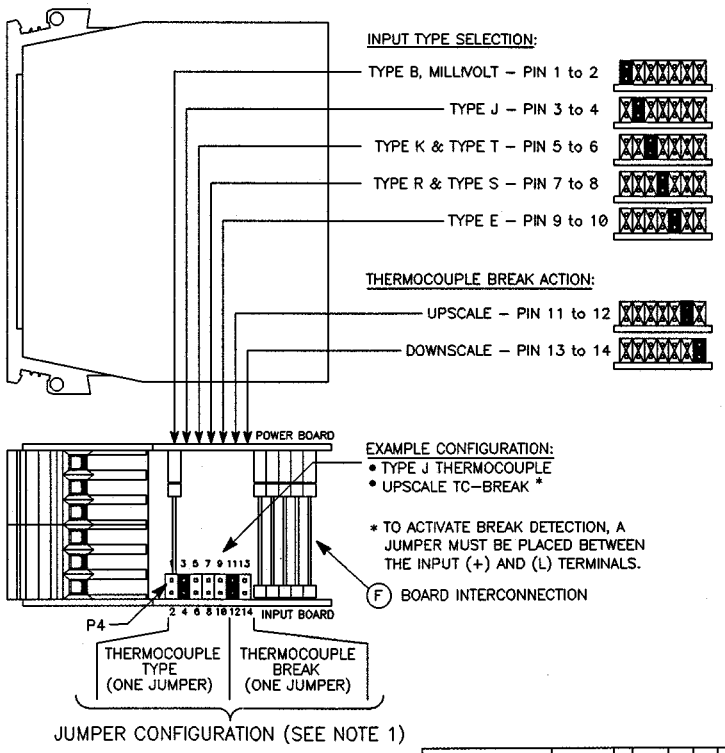
TITLE: 450T mV/TC CALIBRATION CONNECTIONS

SIZE	SERIES		DWG NO.	REV
D	450T	1 OF 1	4501−350	A





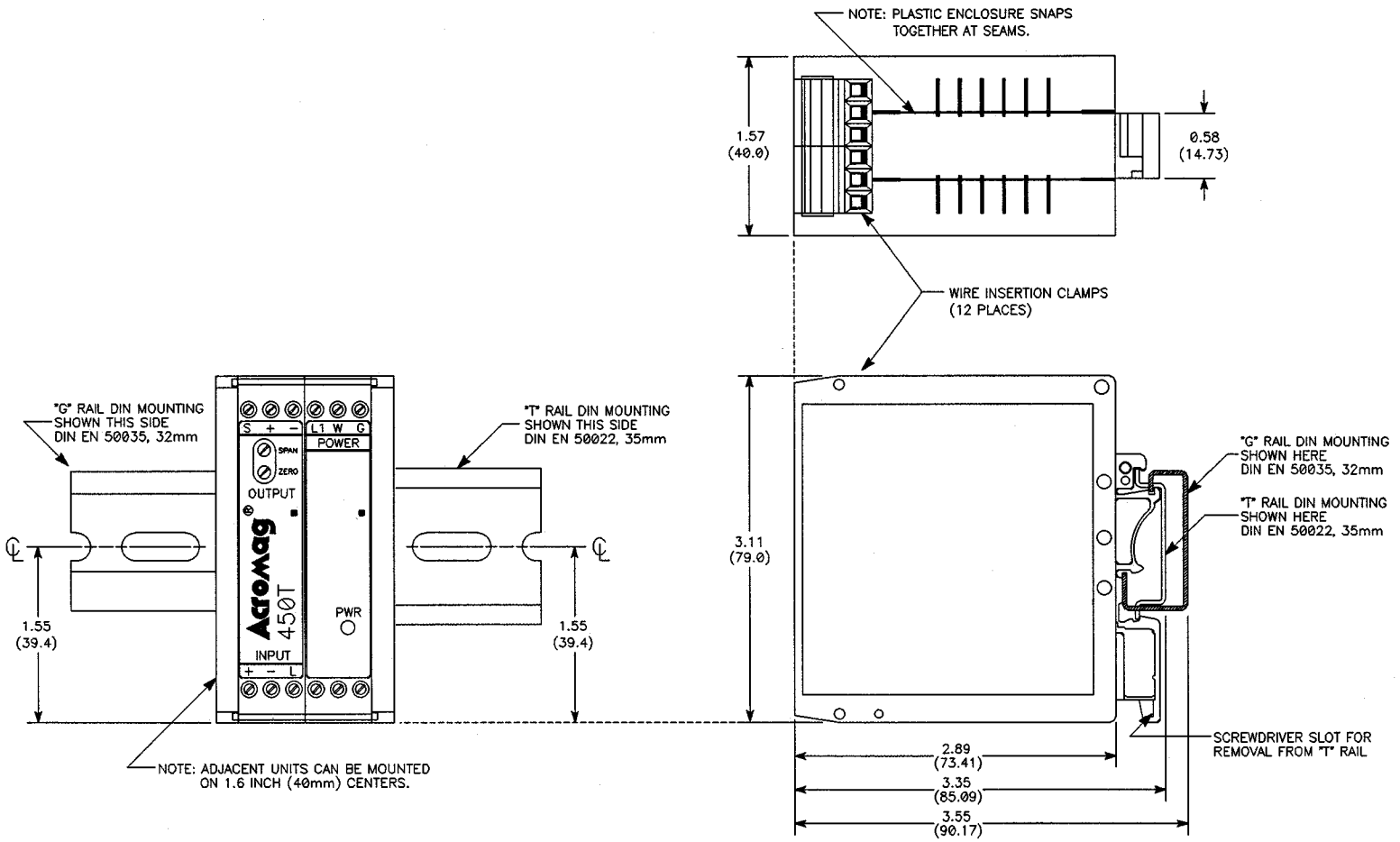



INPUT TYPE SELECTION:
TYPE B, MILLIVOLT – PIN 1 to 2
TYPE J – PIN 3 to 4
TYPE K & TYPE T – PIN 5 to 6
TYPE R & TYPE S – PIN 7 to 8
TYPE E – PIN 9 to 10
THERMOCOUPLE BREAK ACTION:
UPSCALE – PIN 11 to 12
DOWNSCALE – PIN 13 to 14
POWER BOARD
EXAMPLE CONFIGURATION:
• TYPE J THERMOCOUPLE
• UPSCALE TC–BREAK *
* TO ACTIVATE BREAK DETECTION, A JUMPER MUST BE PLACED BETWEEN THE INPUT (+) AND (L) TERMINALS.
(F) BOARD INTERCONNECTION
1 3 5 7 9 11 13
2 4 6 8 10 12 14
INPUT BOARD
P4
THERMOCOUPLE TYPE (ONE JUMPER)
THERMOCOUPLE BREAK (ONE JUMPER)
JUMPER CONFIGURATION (SEE NOTE 1)

NOTE: 1. REFER TO THE CALIBRATION SECTION OF THE MANUAL FOR DETAILED INSTRUCTIONS.

SERIES 450T mV/TC JUMPER CONFIGURATION

Acromag WIXOM, MICH.							
		23 SEP 93	A	—	KG	BC	BC
		DATE	REV	ECN	DR	ENG	CLP
TITLE: 450T mV/TC JUMPER CONFIGURATION							
D	SERIES: 450T	1 OF 1	DWG NO. 4501-351	A	REV		


NOTE: PLASTIC ENCLOSURE SNAPS TOGETHER AT SEAMS.
1.57 (40.0)
0.58 (14.73)
WIRE INSERTION CLAMPS (12 PLACES)
"G" RAIL DIN MOUNTING SHOWN THIS SIDE DIN EN 50035, 32mm
"T" RAIL DIN MOUNTING SHOWN THIS SIDE DIN EN 50022, 35mm
S + − L1 W G
POWER
SPAN
ZERO
OUTPUT
Acromag
450T
PWR
INPUT
+ − L
1.55 (39.4)
1.55 (39.4)
3.11 (79.0)
"G" RAIL DIN MOUNTING SHOWN HERE DIN EN 50035, 32mm
"T" RAIL DIN MOUNTING SHOWN HERE DIN EN 50022, 35mm
SCREWDRIVER SLOT FOR REMOVAL FROM "T" RAIL
NOTE: ADJACENT UNITS CAN BE MOUNTED ON 1.6 INCH (40mm) CENTERS.
2.89 (73.41)
3.35 (85.09)
3.55 (90.17)

ENCLOSURE DIMENSIONS FOR DIN RAIL MOUNTING

NOTE: ALL DIMENSIONS ARE IN INCHES (MILLIMETERS).

Acromag WIXOM, MICH.

DATE	REV	ECN	DR	ENG	QLP
23 SEP 93	A	—	KG	BC	BC

TITLE: SERIES 450T HOUSING: DIN RAIL MOUNT

SIZE	SERIES		DWG NO.	REV
D	450T	1 of 1	4501-348	A